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# New Product Concept Identification Form

<b>New Product Name:</b> Load Lock Vacuum Sensor (LLVS)	<b>Time Spent Reviewing Concept:</b> Sixteen Hours	<b>Project #:</b> _____
<b>First Person at MKS to Identify Concept:</b> Name: Jim Stafford		
<b>First Person in Marketplace to Identify Concept:</b> VRC introduced a combined Pirani sensor and diaphragm sensor to provide a single output from 1 mTorr to 1500 Torr. This sensor will provide the low pressure measurement for base pressure of the load lock as well as the pressure indication for cross over and vent stages of the load lock. Please refer to MKS article in Oct 1997 issue of Solid State Technology for information on this application.		
Name: VRC ,Varian and Teledyne Hastings		
<b>Describe How Concept was Identified:</b> Concept was identified by customer visits, review of literature and competitive analysis. The combination of the diaphragm gauge eliminates many of the disadvantages of using a convection type sensor. This sensor improves response time, accuracy and eliminates gas dependence while at the same time allowing rough measurements required for base pressure measurements.		
<b>Who Else is Aware of this Concept?</b> This concept has been "tossed" around for several years. However, a target market has never been identified. The next expansion in the semiconductor industry will be looking for unique products to <b>reduce cost and increase performance</b> . This new sensor has the potential for achieving both.		
<b>Product Description:</b> The product that would fit the semiconductor industry would be a transducer type gauge providing a single logarithmic analog output from 1 mTorr to 1500 Torr. A digital version would also be very desirable. The additional cost of the digital electronics (as a % of the sensor cost) would be much less than for a conventional convection sensor cover the same pressure range. In addition, there would be the added advantage of reduce cabling and the number of ports for the user.		
<b>Time/Window of Product to Market:</b> The completion of the initial 300mm tools for development fabs has reduce the urgency for this product. The real opportunity will be in the cost reduction measures that will be taken by the tool manufacturers as these tools go into production		
<b>Summary:</b> The semiconductor industry is currently designing tools to produce products for the 21st century. Our customers are looking for solutions to specific problems on their equipment. This "new" sensor solves many of the problems that customers have been enduring for the last 10 years. These problems will only get worse as the chamber sizes increase.		

## New Product Concept Identification Form (Cont.)

<b>CLASSIFICATION</b>						
<b>Division</b> PCIG <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> HPS <input checked="" type="checkbox"/> UTI <input type="checkbox"/> Germany <input type="checkbox"/> Japan <input type="checkbox"/> Korea <input type="checkbox"/>	<b>Market Region</b> N. America <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Asia <input checked="" type="checkbox"/> Other <input type="checkbox"/>	<b>Market Window</b> Tight <input type="checkbox"/> Open <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> <input type="checkbox"/>	<b>Technical Difficulty</b> High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/>			
					Market Place	Manufacturing Resources
					Large	Existing Production Line <input type="checkbox"/>
					Moderate	Expansion Required <input checked="" type="checkbox"/>
	Established Customer Request	Established <input type="checkbox"/> <input type="checkbox"/>	New Line Required <input type="checkbox"/>			
						Customer Request <input type="checkbox"/>
<b>ACTION TO TAKE</b>			<b>REASON</b>			
Hold <input type="checkbox"/>						
Need Cust. Input to Proceed <input type="checkbox"/>						
Need MKS Input to Proceed <input type="checkbox"/>						
Begin Regular DEF Proposal <input type="checkbox"/>						
Begin Expedited DEF Proposal <input type="checkbox"/>						
Marketing: Date:	Product Mgr: Date:	Product Selection Committee: Date:				
President: Date:	Controller: Date:	Exec. VP Technology: Date:				
VP Pressure Group: Date:	VP PCIG: Date:					

**MKS CONFIDENTIAL**

FRM12764, Rev. E pg. 5 of 5

Operation: MKS  
Vacuum Products

Product Concept: Load Lock Vacuum Sensor

SUBMITTED BY:

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Date Submitted: \_\_\_/\_\_\_/\_\_\_

**MKS CONFIDENTIAL**

Idea came from:

Jim Stafford

on date:

11/2/87

Concept Approved for Product Definition  
Operations Manager and Date:

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Development Proposal Due: \_\_\_\_\_

Account Number: \_\_\_\_\_

# PRODUCT CONCEPT

## Definition Proposal

## Business Opportunity

**Product Description** The sensor would provide a single analog or digital output from  $1 \times 10^{-4}$  to 1000 Torr. The low vacuum range (10-1000 Torr) would be gas independent.

Product Type
<input checked="" type="checkbox"/> Evolutionary
<input type="checkbox"/> Incremental
<input type="checkbox"/> Next Generation

**Target Market/Customers** Semiconductor OEM manufacturers.  
Load Locks, transfer chambers, and exit chambers.

Market Growth
<input type="checkbox"/> Fast
<input type="checkbox"/> Normal
<input type="checkbox"/> Slow

**Key Market Needs including Customer's Stated Requirements, Expected Price, and Applications**

Customers needs outlined in MKS article in SST Oct. 1997 issue "Pressure Measurement and Control in Load Locks".  
Three functions

### Existing Competitive Product and Sales Price

Varian \$525.00 sensor only

List Price \$ 750

Expected Discount \$ 12 15 %

Expected Average Selling Price \$ 637 100 %

Material & Labor Cost \$ 150 23 %

Cost of Selling (5% ASP) \$ 32 5 %

Direct Margin \$ 455 70 %

### Expected Competitive Product

Teledyne Hastings - solid state sensor  
Balzers

### Market Window We Must Hit and Why

The next window is cost reduction on 300mm which may be 1 to 2 yrs.

### Annual Market Size at Maturity

Market 1 \$3 million

### Markets

Semiconductor Equipment

Market Size

5 million

Share %

60%

Revenue

\$18 m

Market 2 \$1 million

Analytical Equipment

Market Size

2 million

Share %

50%

Revenue

\$90k

Market 3

Total

### Effect on Other MKS Products. (Increase or decrease in units and dollars)

Decrease pressure switch and CEP sales  
2 Pressure switches -  $370 \times 2$  } 1070  
1 CEP 330 }

**Summary... Why should we develop this product? (Develop new market, protect existing market, etc...)**

Protect existing market.

Higher margin product because eliminating multiple sensors

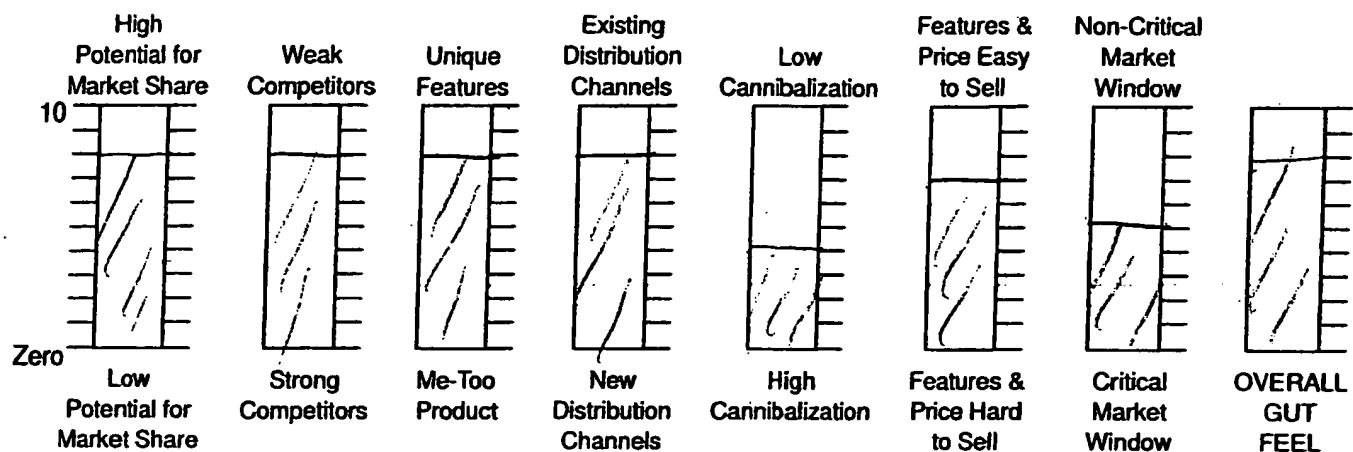
Definition Proposal	PRODUCT CONCEPT	Product Description
Critical Specifications (Examples are accuracy, materials, size, cost, essential features)		
Specifications dictated by needs to control pumpdown and vent cycles. Hood lock door activation accuracy 15% gas independent (N <sub>2</sub> , He, Ar) 760 torr Soft pump switch accuracy 10% 10 Torr Crossover (transf. chamber) (process chamber) accuracy 50% 1x10 <sup>-3</sup> Torr		
How the Product Will Change the Existing Product Line		This depends very much on how the product is designed. If the product is designed using specs above it would complement existing lines. Tradeoff: accuracy vs convenience.
How the Product Differs from MKS and Competitive Alternatives		Product would differ in that it would bring MKS Baratron technology to the table along with its marketing power.
Expected Reuse from Prior Products	yes, use existing Baratron and Pirani technology	
New Manufacturing Processes and Materials Required		Potentially require die attach and wirebonder.
Inventions and Patents (Preliminary)	none	
Safety, Regulatory, and Environmental Issues	CE mark	

# PRODUCT CONCEPT

## Definition Proposal

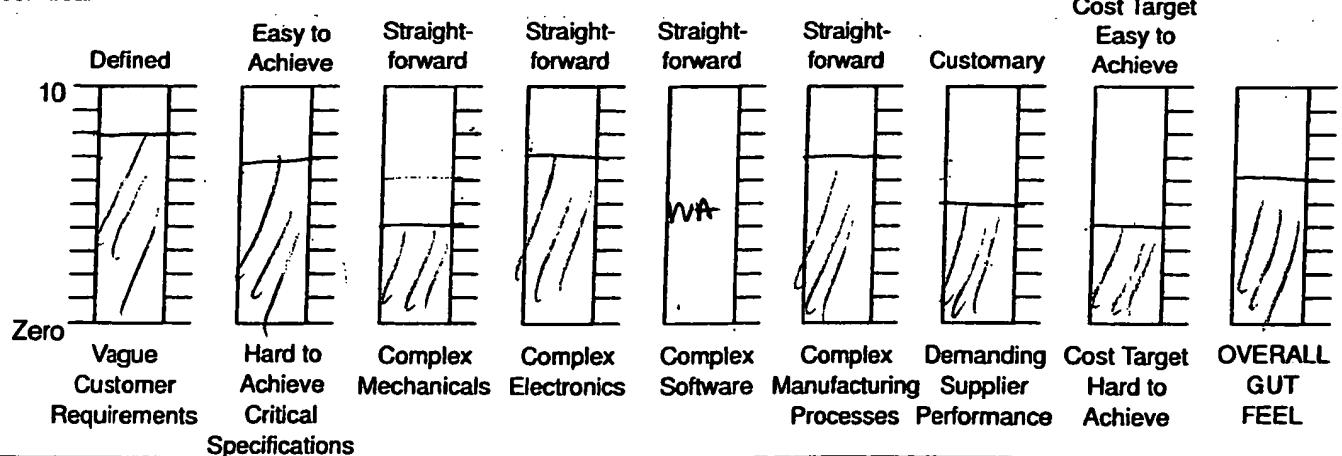
## Risk Analysis

### Market



**Market Risk Summary** The risk is that a competitor will come to market that may eliminate the need for several separate "dumb" switches and a proxy sensor. This is especially true due to the digitization of the sensors.

### Technical



### Technical Risk Summary

Risks are

- 1) over speeding sensor for application
- 2) keeping packaging costs down

# PRODUCT CONCEPT

## Definition Proposal

## Resources

Progress-to-Date (Technology, specifications, market research, etc...)

There is a general trend to combine sensor technologies to achieve broader range pressure measurement.

In addition adding digital capability to combined sensors will certainly provide cost advantages to users. This eliminates the need to have essentially the same digital components stuck on several sensors.

### Obstacles Needing to be Cleared

Determination of technologies/packaging used to meet cost goals.

### Definition Phase Team

<u>Function</u>	<u>Name</u>	<u>Weeks Req'd</u>
Team Leader	_____	_____
Marketing	_____	_____
Product Management	_____	_____
Electrical Engineering	_____	_____
Mechanical Engineering	_____	_____
Software Engineering	_____	_____
Applications Engineering	_____	_____
Manufacturing Engineering	_____	_____
Test Engineering	_____	_____
Purchasing	_____	_____
Other: _____	_____	_____
Other: _____	_____	_____
Other: _____	_____	_____

Total Weeks of Effort Required to Complete the Definition Phase: =====

Duration of Definition Phase:        Months

Other Needs